Amendments to the Claims:

Please amend claims 1, 3, 8, 15, 20, and 22.

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A semiconductor laser, comprising:

a first optical gain element that generates a first light beam having a first optical frequency;

a second optical gain element that generates a second light beam having a second optical frequency;

a nonlinear optical element that is coupled to said first and second optical elements and mixes the first and second high beams to create a polarization wave having a third optical frequency; and,

a plurality of electrical contacts that generate a spatially alternating electric field that phase matches the polarization wave to generate a third light beam having the third optical frequency.

2. (Original) The laser of claim 1, wherein the third optical frequency is in a range from the Infrared to the THz regions.

3. (Currently Amended) The laser of claim 1, wherein said electrical contacts~~electrodes~~ have opposite polarities.

4. (Original) The laser of claim 1, wherein said nonlinear optical element includes a waveguide optically coupled to said first and second gain elements.

5. (Original) The laser of claim 1, further comprising a diffraction grating tuned to the third optical frequency of the third light beam.

6. (Original) The laser of claim 1, wherein the semiconductor laser is fabricated with group III-V material.

7. (Original) The laser of claim 6, wherein the spatially alternating electric field modulates a nonlinear susceptibility of the group III-V material.

8. (Currently Amended) A semiconductor laser, comprising:

gain means for generating a first light beam having a first frequency and a second light beam having a second frequency;

mixing means for mixing the first and second light beams and creating a polarization wave having a third optical frequency; and,

matching means for generating a spatially alternating electric field and phase matching the polarization wave to a third light beam at the third optical frequency.

9. (Original) The laser of claim 8, wherein the third frequency is in a range from the Infrared to the THz regions.

10. (Original) The laser of claim 8, wherein said matching means includes a plurality of electrodes that have opposite polarities.

11. (Original) The laser of claim 8, wherein said mixing means includes a waveguide.

12. (Original) The laser of claim 8, further comprising a diffraction grating tuned to the third optical frequency of the third light beam.

13. (Original) The laser of claim 8, wherein the semiconductor laser is fabricated with group III-V material.

14. (Original) The laser of claim 13, wherein the spatially alternating electric field modulates a nonlinear susceptibility of the group III-V material.

15. (Currently Amended) A method for operating a semiconductor laser, comprising:

generating a first light beam having a first frequency;

generating a second light beam having a second frequency;

mixing the first and second light~~two~~ beams to generate polarization wave having a third optical frequency, and,

generating a spatially varying electrostatic field that phase matches the polarization wave to a third light beam with the third optical frequency.

16. (Original) The method of claim 15, wherein the third optical frequency is in a frequency from the Infrared to the THz regions.

17. (Original) The method of claim 15, wherein the first and second light beams travel along a waveguide.

18. (Original) The method of claim 15, wherein the spatially alternating electric field is generated by a plurality of electrodes having opposite polarities.

19. (Original) The method of claim 15, wherein the spatially alternating electric field modulates a nonlinear susceptibility of a material of the semiconductor laser.

20. (Currently Amended) A semiconductor laser, comprising:

a first optical gain element that generates a first light beam having a first frequency;

a nonlinear optical element to pump the first light beam to create a polarization wave having a second optical frequency and a third optical frequency by optical parametric oscillation; and,

a plurality of electrical contacts that generate a spatially alternating field that phase matches the polarization wave to the third optical frequency.

21. (Original) The laser of claim 20, wherein the third optical frequency is in a range from the Infrared to the THz regions.

22. (Currently Amended) The laser of claim 20, wherein said electrical contacts~~electrodes~~ have opposite polarities.

23. (Currently Amended) The laser of claim 20, wherein said nonlinear optical element includes a waveguide optically coupled to said first optical~~and second~~ gain element ~~elements~~.

24. (Original) The laser of claim 20, further comprising a diffraction grating tuned to the third optical frequency of the third light beam.

25. (Original) The laser of claim 20, wherein the semiconductor laser is fabricated with group III-V material.

26. (Original) The laser of claim 20, wherein the spatially alternating electric field modulates a nonlinear susceptibility of the group III-V material.